

***Remarks***

Reconsideration of the application is respectfully requested.

Claims 1-13 are sought to be cancelled without prejudice or disclaimer. Applicant reserves the right to prosecute similar or broader claims in a continuation application. Claims 14-25 are sought to be added. Upon entering this amendment, Claims 14-25 are pending in the application, with 14 and 20 being the independent claims. No new matter has been entered by the amendments.

Based on the above amendments and following remarks, Applicant respectfully requests that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

***Objection to the Claims***

Claims 9 and 12 were objected to by the Examiner. Although Applicant disagrees with the objections, the claims were cancelled for other reasons. Accordingly, Applicant believes the objections should be rendered moot.

***Rejections under 35 U.S.C. § 102(b) and 103(a)***

Claims 1, 2, and 6 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,144,236 to Matsugu et al. ("Matsugu"). Claims 8, 11, and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,646,658 to Holzapfel et al. ("Holzapfel"). Claims 3 and 4 were rejected under 35 U.S.C. §103(a) as being unpatentable over Matsugu in view of Holzapfel. Claims 5, 7, 9, 10, and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Matsugu in view of Holzapfel and in further view of U.S. Patent No. 4,821,277 to Alphonse et al. ("Alphonse"). Applicant respectfully traverses these rejections.

Although Applicant disagrees with these rejections, Applicant has cancelled claims 1-13 for other reasons and in order to expedite prosecution. Thus, Applicant believes these rejections are now moot.

#### **New Claims 14-25**

Matsugu teaches an alignment head 6 including a light source 10 that projects light through a collimating and projecting lens 11 and off of mirror 12 onto alignment marks 3a and 4a. Diffracted light from alignment marks 3a and 4a is received through mirror 12 onto a light receiving surface 9 of a detector 8. The light source 10 and detector 8 are on two different surfaces of alignment head 6. In contrast to the interpretation of this reference on page 2 of the Office Action, wafer chuck 5 and X-Y table 100 of Matsugu are not teaching or suggesting a support system having a light source and detector coupled thereto. Also in contrast to the interpretation of this reference on page 2 of the Office Action, receiving surface 9 is not a superluminescent device. Further, in contrast to the interpretation on page 3 of the Office Action, Matsugu's teaching of suppressing speckle caused by light scattering from edges of alignment marks or resist is not similar or analogous to claimed recitations of substantially eliminating interference from ghost or spurious reflections, which occur, for example, from lenses in the optical system. Finally, in contrast to the interpretation on page 3 of the Office Action, there is no teaching or suggestion in Matsugu of using interferometry.

Holzapfel teaches an encoder or position measuring device that reflects signals from gratings to generate reference pulses, where a number of detected reference pulses indicates a position.

Alphonse teaches a super-luminescent diode and its structure.

New independent claim 14, which contains similar features to now cancelled claims 1, 3, and 4, recites a position determining system in an exposure portion of a lithography tool, the system comprising:

- a superluminescent device (SLD) that transmits a light beam;
- a lens system that directs the light beam onto a portion of an object; and
- a sensor that receives light diffracted by the portion of the object via the lens system, the sensor configured to use the diffracted light to determine a position of the object,

wherein the SLD is configured to produce a coherence length of the light beam that is less than a thickness of a lens in the lens system or less than a distance between lenses within the lens system.

None of the applied references, either alone or in combination, teach or suggest the combination of these features. For example, none of the applied references teach or suggest at least “a lens system that directs the light beam onto a portion of an object and a sensor that receives light diffracted by the portion of the object via the lens system, the sensor configured to use the diffracted light to determine a position of the object.” Accordingly, Applicant respectfully submits that the claim 14 is allowable. Also, at least based on their dependency to claim 14, Applicant submits that claims 15-19 are also allowable.

New independent claim 20, which contains features similar to now cancelled claims 8, 11, and 13, recites a position measuring method, comprising:

- generating superluminescent light having a coherence length;
- directing the superluminescent light onto a target using an optical system;
- diffracting superluminescent light from the target to produce +/- first order diffracted beams;
- directing the +/- first order diffracted beams using the optical system onto a combining element;
- combining the +/- first order diffracted beams using the combining element; and
- determining a position of the target based on an interference pattern generated from the combining step, wherein the coherence length is less than a thickness of a lens in the lens system or less than a distance between lenses within the lens system.

None of the applied references, either alone or in combination, teach or suggest the combination of these features. For example, none the applied references teach or suggest at least “directing the +/- first order diffracted beams using the lens system onto a combining element.” Accordingly, Applicant respectfully submits that claim 20 is allowable. Also, at least based on their dependency to claim 20, Applicant submits that claims 21-25 are also allowable.

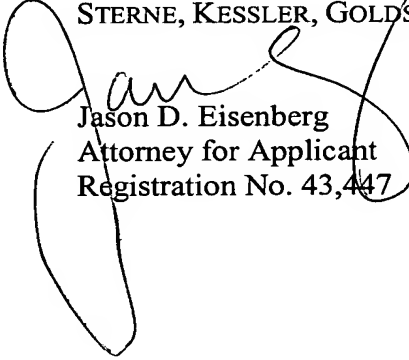
***Conclusion***

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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